Building Network RT/RW Net Based Hotspot WI-FI In Tinawas Village Boyolali Jawa Tengah

Conceived as a Condition of Completing Strata 1 Program at the Department Informatics Faculty of Communication and Information

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UNIVERSITAS MUHAMMADIYAH SURAKARTA

2017

PAGE APPROVAL

Building Network RT/RW Net Based Hotspot WI-FI In Tinawas Village Boyolali Jawa Tengah

SCIENTIFIC PUBLICATIONS

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L 200 134 009

Has been inspected and approved to be tested by :

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Program Studi	:	Informatika
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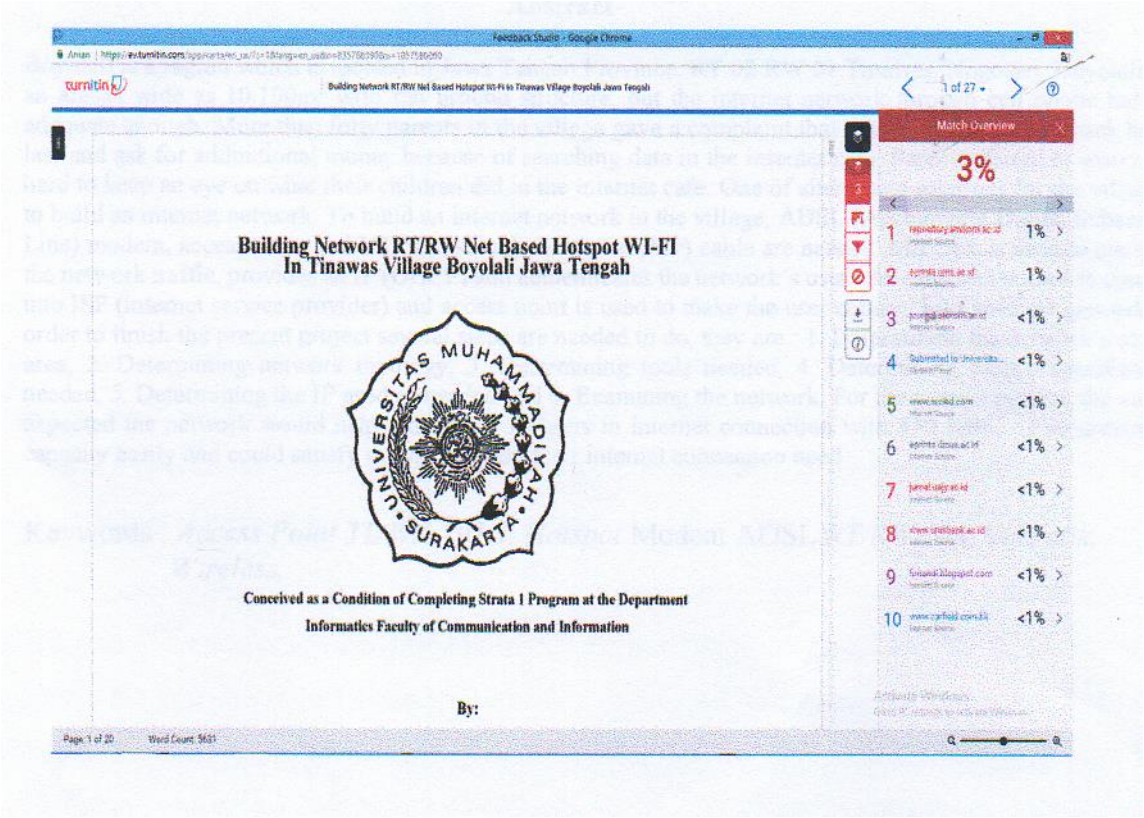
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Page: 1 of 20
Word Count: 5631

Building Network RT/RW Net Based Hotspot WI-FI In Tinawas Village Boyolali Jawa Tengah

Abstract

Boyolali is a region which is located in Jawa Tengah Province. RT 02 RW 01 Tinawas, Nogosari, Boyolali has an areaas wide as 10.100m^2 with flat ground structure, but the internet network through cell phone has not adequate enough. More than forty parents in the village gave a complaint that their children always back home late and ask for addinitional money because of searching data in the internet cafe. Parents started to worry and hard to keep an eye on what their children did in the internet cafe. One of alternative solutions for the village is to build an internet network. To build an internet network in the village, ADSL (Asymmetric Digital Subscriber Line**)** modem**,** access point and UTP (Unshielded Twisted-Pair**)** cable are needed. Mikrotik is used to maintain the network traffic, provides an IP (DHCP) and authenticates the network's user while modem is used to connect into ISP (internet service provider) and access point is used to make the user connect into wireless network. In order to finish the present project several steps are needed to do, they are : 1. Determining the network's access area, 2. Determining network topology, 3. Determining tools needed, 4. Determining tools's specification needed, 5. Determining the IP used as needed and 6. Examining the network. For the present project, the author expected the network would help more than 30 users in internet connection with 350 KBps as its maximum capacity easily and could satisfy the villagers on their internet connection need.

Keywords : *Access Point TL WA 701N, Hotspot* Modem ADSL *RT/RW-Net, Mikrotik, Wireless.*

Boyolali merupakan suatu daerah yang terletak di provinsi Jawa Tengah. Desa Tinawas RT 02 RW 01, Nogosari, Boyolali mempunyai wilayah seluas 10.100m2 dengan struktur tanah datar, akan tetapi jaringan internet di sana melalui telepon seluler belum cukup memadai. Lebih dari empat puluh orang tua yang ada di desa mengeluhkan bahwa anak mereka sering pulang larut dan meminta tambahan uang saku dengan alasan mencari data di warung internet (warnet). Para orang tua mulai khawatir dan sulit untuk mengawasi apa yang anak anak mereka lakukan di warnet. Salah satu solusi alternatif bagi desa tersebut yaitu dengan membangun jaringan internet.untuk membangun jaringan internet di desa tersebut dibutuhkan ADSL (Asymmetric Digital Subscriber Line) modem, access point dan kabel UTP (Unshielded Twisted-Pair). Mikrotik digunakan untuk mengatur lalu lintas jaringan, menyediakan IP (DHCP) dan memverifikasi jaringan pengguna sedangkan modem digunakan agar dapat terhubung ke ISP (internet service provider) dan access point ditujukan agar pengguna dapat terhubung ke dalam jaringan internet. Untuk menyelesaikan proyek ini, ada beberapa langkah yang harus dilakukan, yaitu : 1. Menentukan wilayah akses jaringan, 2. Menentukan topologi jaringan, 3. Menentukan alat alat yang akan digunakan, 4. Menentukan sepesifikasi alat yang akan digunakan, 5. Menentukan IP yang digunakan sesuai kebutuhan dan 6. Pengujian jaringan. Di proyek ini, penulis berharap jaringan yang dibangun dapat membantu kurang lebih 30 pengguna internet dengan kecepatan maksimum 350 KBps dan dapat memuaskan kebutuhan penduduk desa dalam kebutuhan mereka akan internet.

Kata kunci : *Access Point TL WA 701N, Hotspot* Modem ADSL *RT/RW-Net, Mikrotik, Wireless.*

1.INTRODUCTION

The internet is a collection of interconnected computer networks and often we are familiar with the term Internet Protocol (IP) and Transmission Control Protocol (TCP) which basically to streamline a communication process that is connected to various applications, such as Web, VoOP, E-Mail Purbo (2005) and Allan (2005). In Indonesia, the internet has became as a daily need for each individual in

every sector. By using internet, all the needs, information could be obtained quickly and easily. Because of the important of the internet, internet facilities are expected to be accessed by the society.

In some rural areas of Indonesia, internet has not accessed yet with steady pace. Local wireless once implemented by Ariyanto Susanto, (2009) in Semarang. Tinawas village RT 02 RW 01 Nogosari Boyolali is one of the villages that have difficulty getting internet signal. Therefore, the villager, especially students must go out to get a stable internet facility by hiring services inside the internet cafe. Because based on writer's observation, there is no internet cafe in Tinawas village RT 02 RW / 01. While the nearest internet cafe is about 500 meters away from the village.

Many parents complain that their children are often undisciplined when they come home from school. They feel worried when the child has to come home late every day. Feeling worried about the intercourse of the first child in adolescence, worrying about road safety and even worrying about their childs' health. Parents' regret when they asked and answer obtained was their children queue and play internet in the internet cafe. In addition their children also asking for additional pocket money because the need to find data in the internet cafes that has always been a mandatory requirement for these students. Kustanto (2014) once analized the worry of the student's discipline level who use the internet without control in the globalization eras.

The geographical condition of the village is flat, this mean that the village area with the absence of a hill and without obstructed by the high building. The village has an area of ±10,100 m^2 and with a density of 14 houses, 1 mosque, 1 volleyball court, 1 Badminton field and 1 school in the sense of the need for the creation of a special internet network for densely populated villages as well as the lack of construction of high-rise buildings.

Fattah et al. (2017) conducted Mapping and design of computer network in the new rectorate building at IAIN (State Institute of Islamic Studies) Surakarta. Mulyadi, P.I (2015) also built and analyzed a RT / RW Net Network based on Hotspot WI-FI as a Cheap Internet Solution in RT 13 RW 03 Cokrodiningrat, Jetis Daerah Istimewa Yogyakarta. From the works above, it could be concluded that the internet network development must have good Mapping and design for internet network so that it can well spreads and people can feel the stable internet facility.

The development of RW Net-based RT network Hotspot in the sense of one of the main solutions that writers can convey in reducing the concerns of parents to their children. In addition, parents can subscribe to RT RW Net with a fixed budget. People no longer have to leave home to get internet facility. By coming directly to the home admin who resides in neighborhood RT 02 RW 01 to

enter MAC Addres so that users can directly subscribe and use the internet in the village. In term of bandwith management the author take Bana et al. (2011) as reference.

Based on this background, the authors propose to build a network RT / RW net based WI-FI hotspot in RT 02 RW 01 Tinawas village in the hope of providing internet facilities to the residents of Tinawas village especially the students. Because it will greatly make the level to the efficient time and energy if every time we want to get internet access must be out of the village to go to internet cafe (Henry, 2008).

2.METHOD

Based on the problems mentioned above, a framework of methods is made in the hope of helping to solve the problem systematically. The method consists of the following steps: (a) System requirements analysis. (b) System design. (c) Implementation. (d) Testing.

a) System requirement analysis is where some of the material needs in the system will be used to add and assist in the process of making an object. This stage starts from collecting the results of interviews with some local people, especially the villagers of Tinawas Village. The result of this interview can be analyzed to be recommended in building a new system of hotspot network in RT 02 RW 01 Tinawas village. System requirement needed are requirement of hardware, requirement of software and human resource. In developing of internet network, especially in mapping analysis, the author also paid attention to the village map that only has the area ±10 100 m^2 and with density of 14 houses, 1 mosque, 1 volleyball field, 1 field Badminton and 1 school in the sense of need for the creation of a special internet network for dense villages and does not have a wide area and still lack of construction of high-rise buildings. In addition, the villager gather frequently because of the many sports activities in the morning and afternoon in the school environment and sports arena. See figure 1a and 1b

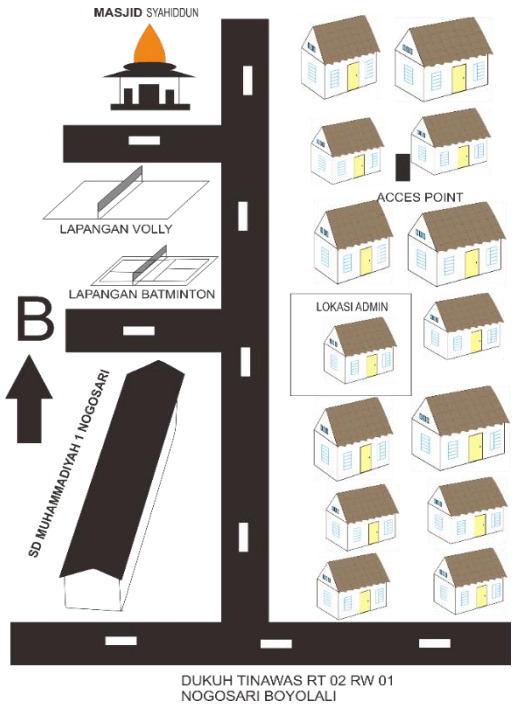

Figure 1a. Real pict of Tinawas village RT 02 RW 01 Nogosari Boyolali

Figure 1b. Maps of Tinawas village RT 02 RW 01 Nogosari Boyolali

b) RT 02 RW 01 Tinawas Village Boyolali Jawa Tengah is a region which is hard to make an internet connnection. With the condition of the village which is no hill around and is located only one kilo meter from the Internet Service Provider (ISP) then we take the initiative to build a hotspot-based internet network in the village.

The process of making the internet consists of hardware and software (Martin, 2013). Hardware in computer systems has a very important role in running the system. Each hardware has a different function, but has the same goal which is to run the Internet connection system. The following are list of hardware that will be used in building a Wi-FI based RT / RW Net Network: Mikrotik server router, TL WA 701N access point, POE (Power Over Ethernet), UTP / STP Tower Cable. While the software needed to build a network RT / RW Net Wi-Fi hotspot based. Microtik router used here is a Mikrotik OS router that is installed on the routers RB750r2-HEX series (winbox v3.11). Windows 7. In acces point there is also a TP LINK web installation by entering IP address and set in TP LINK web, and for determining the internet access speed, speedtest software is needed. After determining the hardware and software, tools installed as seen at figure 2.

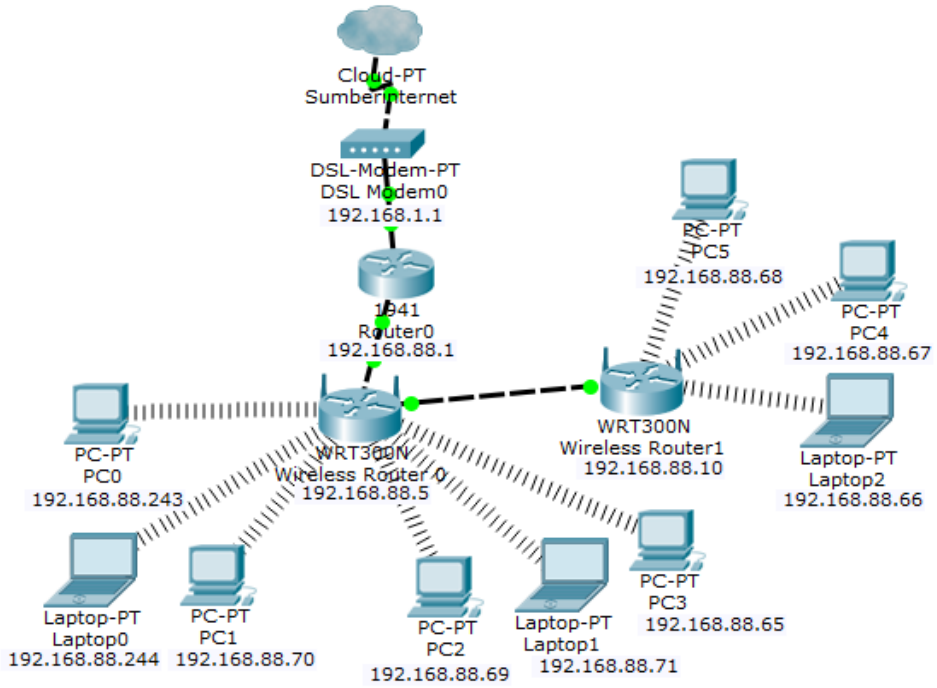

Figure 2. Topology Of RT RW Net Tinawas village

c) For the present project, writer refers to the model ever applied by Nur Fajar (2008). The use of network management based on Wi-Fi RT / RW Net hotspot, starting from the Internet service provider (ISP) in the relationship through point to point to the ADSL modem and get IP 192.168.1.1. Once IP was obtained from ADSL modem then IP internet is changed and set in Mikrotik RB 750 with IP 192.168.88.1 then it is connected to the access point TL WA 701N with IP 192.168.88.5 in order to be accessed by user through the wireless. Access point TL WA 701N that has got internet connection and then plug in the cable which is 70 meters distance accsess point to two with IP 192.168.88.10. While the gate way in the DHCP setting comes from Mikrotik RB 750 is connected to the router Mikrotik on ethernet-0 then the public IP in NAT (Network Address Translation) is changed in the Mikrotik to get the security of IP users so that the right to give the user IP is Mikrotik. Mikrotik RB 750 can be made in local IP on ethernet-1. Then ethernet-1 is connected to the access point TL WA 701N so the client can connect to the wireless network. With the design process like this then the network RT / RW Net can be distributed through wifi hotspot to the client, see figure 3.

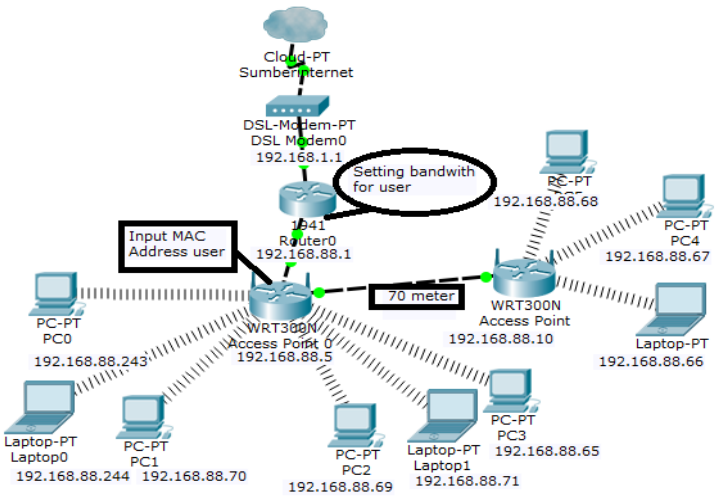

Figure 3. Flowchart implementation network

d) When all devices are installed then users can connect to the hotspot network. MAC-address for all users's devices must be registered in the access point TL WA 701N if they want to connect to the internet. After all users's MAC address are registered and connected to the internet, the admin will set the limitation of user bandwidth through Mikrotik RB 750. With bandwidth arrangement capacity ± 350 KBps, it is to be expected that user can access the internet steadily.

The way to maintain network security is to register a Mac-address wireless client on the access list. This should be done on the Access Point TL WA 701N. If input-list input has been done, then turn off the default authenticated feature on wireless, then if there is a device which has not registered its Mac address yet will not be connected to the network. This is a way to grant permission to the user to enjoy internet service.

In the Mikrotik security we provide password login so that others can not access Mikrotik setting. In addition for providing a login password in Mikrotik the other security system made is done on the access point TL WA 701N in admin access login. This was done with the purpose to grant comfortability to the user. So the user needs and bandwidth sharing ± 350 KBps to each user using queue inside Mikrotik RB 750 can run well. In this method the system will be run, observed and evaluated whether it is in accordance with what has been planned.

3.RESULT AND DISCUSSION

The construction of RT / RW Net network based on WI-FI in RT 02 RW 01 Tinawas village is well installed. The signal amplifier is used to amplify the signal from the Internet Service Provider (ISP) to enter the ADSL Modem and in-place inside the house so that it is safe which is not being affected by

rain and lightning. Mikrotik RB 750 is mounted next to ADSL Modem with UTP cable in ethernet -1 through ADSL modem, so Mikrotik could obtain internet network. Ethernet-2 is attached to TL WA 701N access point hole and TP LINK accessory TL WA 7210N installed outside the house is 70 meters away from the first access point.

The Internet Provider (IP) address obtained from the ISP is 192.168.1.1 and it enters the ADSL hotspot modem, then Ip was changed inside Mikrotik rb 750 with new IP 192.168.88.1. After that the internet is spread using TL 701NN access point with radius and IP address 192.168.88.5 and pull the cable as far as 70 meters to the access point TP LINK TL WA 7210N with IP 192.168.88.10. After that the user can access the internet with wirelless. However the user must enter the user's mac address into the TL WA 701N access point. Here is the hardware installation flow of RT / RW Net network based on WI-FI in RT 02 RW 01 Tinawas village.

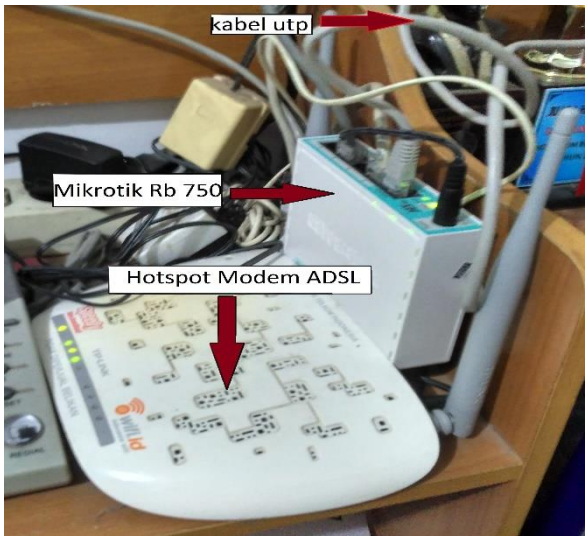

Figure 4. Indoor hardware

Figure 5. Outdoor hardware from above house

Figure 4 is figure of hardwares which are the center of the internet network and located inside the house. Figure 5 is access point TL WA 701N which is located outside the house and was tasked for inputting user's MAC address. Figure 6 is an access point TL WA 7210N which is tasked for spreading the wireless network.

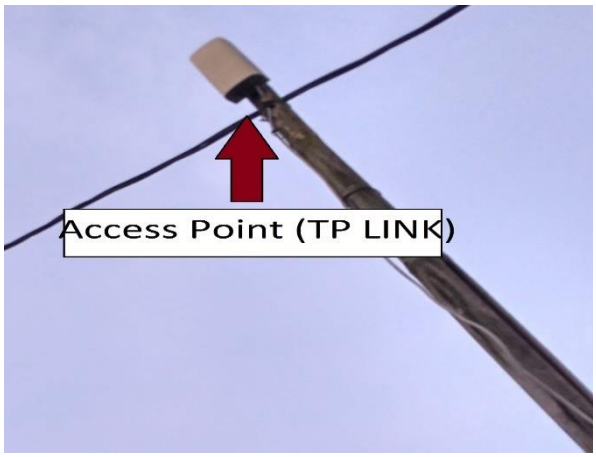

Figure 6. Outdoor hardware from 70m

In building a RT / RW Net network based on WI-FI hotspot in RT 02 RW 01 Tinawas village there are several first step inputting user by entering MAC Address in access point TL WA 701N. This input is intended for the admin easy to choose and specify

who the user who can subscribe to the internet network based on the hotspot. In addition admin will be easy to control the extent to which subscribers are already registered and start subscribing.There are 48 laptop users and 68 mobile users from 80 more citizens who all want to register to be connected to the internet. Citizen data in building RT / RW Net network based on WI-FI hotspot at RT 02 RW 01 Tinawas village is in need. It is very necessary to make internet network security and users can connect subscription. Because before the MAC Address user has not been inputted in the access point the user can not connect by itself. Here is the list of user names RT 02 RW 01 Tinawas village (see table 1).

Table 1. Mac address user in RT 02 RW 01 Of Boyolali District

Type of Hp Device	Laptop Device Type	Type of Hp Device	Laptop Device Type
Gadru HP 00-08-22-DE-8A-38	**Alice acer new** 6B-94-23-74-5D-21	**Fakih HP** D8-57-EF-5D-82-6C	**Vendra Laptop Asus** 28-E3-47-B7-1F-A0
Evercross A7 00-0A-D0-E2-SC-8C	**Zaki Tab Axioa** 00-E2-7247-0C-49	**Fia Tab Advan** 00-0A-00-B9-23-5B	**Fia Laptop Acer** 1C-3E-84-62-F0-C1
Hanifa Hp Soni **1C-7B-21-DD-D9-D3**	**Tito Netbook Toshiba** **68-A3-C4-98-17-92**	**Arya HP Lenovo** **74-04-2B-6F-34-80**	**Aji Laptop Asus** 80-A5-89-6A-1B-3F
Toni HP Iphone **E4-25-E7-4A-0D-64**	**Zaki laptop acer** **74-EA-3A-EE-CC-9E**	**Hanifah Samsung hp** **20-5E-F7-2D-48-E2**	**Alice Acer** 68-94-23-74-5D-21
Santi HP Nokia **10-2F-6B-95-D2-AA**	**Titto Laptop Toshiba** **00-22-FA-9A-E5-A2**	**Rival Laptop Hp** **CC-52-AF93-94-B8**	**Matoni Laptop Acer** F4-B7-E2-86-FE-14
Piu HP Advan **00-27-15-38-24-D2**	**Opi Laptop Asus** **FO-03-8C-15-C9-21**	**Arimbi Tab Mito** **00-08-22-06-2E-63**	**Fakih Laptop** B8-EE-65-51-B1-EB
Edwin Tab Advan **00-0A-00-67-61-BE**	**Ipie Laptop Acer** **00-1E-64-0D-39-DB**	**Rasyid Hp Asus** **70-8B-CD-72-47-F2**	**Salsa Laptop Zirex** 00-1E-65-7D-AC-7A
Edwin HP **20-5E-F7-1A-22-A2**	**Titto Lenovo** **48-88-CA-69-05-E5**	**Fia HP Samsung** **54-40-AD-90-69-0F**	**Erwin laptop asus** **A0-F3-C1-E5-90-1F**
Alif Tablet Advan **00-0A-00-5C-71-C6**	**Danang Laptop** **5C-93-A2-B5-SC-FF**	**Tito HP Samsung E5** **08-EE-8B-EC-70-OC**	**Rasid laptop Toshiba** **7C-F9-0E-02-E1-62**
Opi HP Oppo **A4-32-78-DA-F7-48**	**Diki laptop acer** **F8-D1-11-0C-OB-F0**	**Anis HP** **BC-20-10-2C-0A-E2**	**Arul Laptop Asus** **6C-71-D9-89-2F-53**
Zahra HP Oppo **1C-77-F6-57-7B-DB**	**Aris Laptop** **50-B7-C3-4F-07-38**	**Isa HP Evercross** **68-A3-C4-14-85-43**	**Salsa laptop baru** **00-9C-02-72-9B-41**
Hanif HP Mitto **60-FE-1E-4B-C9-CE**	**Bayu laptop asus** **68-94-23-A1-9E-FD**	**Opi Netbook Hp** **74-F0-6D-4C-29-E2**	**Nisa Laptop Compac** **1C-65-9D-63-8B-91**
Titto HP Samsung **24-C6-96-B8-B7-51**	**Catur Laptop** **CC-52-AF-0F-A9-8C**	**Rasid HP Samsung** **88-A7-3C-EC-34-C0**	**Soleh netbook** **E0-89-22-A6-F5-C1**
Naufal HP **88-70-8C-27-EB-AF**	**Fakih laptop** **30-7C-30-B4-7D-F1**	**Afan HP Samsung** **9C-27-71-66-CB-75**	**Jonatan Laptop** **9C-AD-97-AE-77-5D**
Satrio Hp Lenovo **AC-9E-17-62-F2-D1**	**Santi Laptop Hp** **C4-8E-8F-76-FC-F3**	**Ana Salsa HP 6C-5F-1C-FB-04-AE**	**Isa Laptop Lenovo** **74-E5-43-EE-54-C6**
Diki Hp Asus **2C-D0-5A-15-C2-F4**	**Dian Netbook Asus** **00-08-CA-9E-7D-DF**	**Zaki HP Mito** **9C-04-73-C6-F2-32**	**Salsa Laptop** **9C-B7-0D-C1-6C-FD**
Mateo Tab Asus **60-A4-4C-48-8C-EB**	**Karisma Laptop** **84-4B-F5-99-7B-B4**	**Rasid HP Andromax** **00-07-A8-6D-A5-OC**	**Erlin laptop Toshiba** **00-0A-00-A7-89-5C**
Isa Hp Samsung **7C-F9-CE-03-88-6E**	**Rahman laptop** **18-CA-2D-BD-E4-FC**	**Adit HP evercross** **00-0A-00-5A-5A-EE**	**Desi Laptop Asio** **E0-89-A5-32-84-F2**
Salsa HP Cross A5 **00-9C-02-72-9B-41**	**Damar laptop** **58-A2-85-99-E3-88**	**Opi Tablet Vandroid** **30-AA-BD-04-93-93**	**Rasid Laptop** **B8-86-87-43-7F-35**
Jonathan HP **24-E2-71-12-F4-B0**	**Tatit laptop Samsung** **6C-F3-73-46-80-A4**	**Bimo Tab** **00-08-22-76-BB-FB**	**Ino Netbook Acer** **E0-06-E6-57-4E-06**
Alif Opo **CC-2D-83-98-36-38**	**Santi laptop compac** **00-0A-00-DC-CC-F7**	**Feri Hp evercross** **00-0A-00-59-DA-34**	**David laptop acer** **70-AA-B2-B8-57-5E**
Nisa Hp Opo **8C-DE-E8-FC-65-58**	**Fakih laptop** **00-27-15-54-41-42**	**Lia Tab Mitto** **00-08-22-06-34-43**	**Faisal laptop acer** **08-8C-2C-05-B6-E7**
Opi Hp Samsung **E4-FB-EF-D1-00-EF**	**Rivaldi laptop acer** **00-0A-00-86-1F-60**	**Aral HP Opo** **1C-77-F6-4D-4F-23**	**Ino laptop Toshiba** **B0-DF-3A-40-3B-72**
Soleh Hp **C8-D7-79-4B-5A-70**	**Auli laptop acer** **24-FD-52-49-B2-D0**	**Bayu Hp Lenovo** **CC-07-E4-60-69-A3**	**Maksum laptop** **00-08-22-2F-49-24**

Table 1. Mac address user in RT 02 RW 01 Of Boyolali District (Cont.)

Nisa Hp SPC	**24 Users**	**Salsa Hp Putih**	**24 Users**
EE-4A-5B-11-12-2B		**00-27-15-54-72-13**	
Nurohman Hp		**Nafis Tab Advan**	
54-27-58-1B-32-8B		**00-0A-00-78-AD-64**	
Yoga Hp Smartfren		**Tiyus Hp**	
F6-D0-10-AE-C3-F7		**24-E2-71-C0-BA-66**	
Mateo Hp Asus		**Ian Hp Asus**	
D0-17-C2-84-2F-39		**AC-9E-17-EF-D1-EF**	
Candra Tab		**Kristian Hp**	
00-0A-00-A7-BD-29		**00-49-5A-E8-77-0F**	
Adit Hp Lenovo		**Rahman Hp**	
74-E5-43-EE-54-C6		**18-CA-2D-BD-E4-FC**	
Dea Hp Samsung		**Putra Salon**	
A0-82-1F-72-89-4A		**48-A2-2D-C3-12-73**	
Enggal Tab		**Enggal Tab Ever**	
48-A2-D2-C3-12-72		**48-A2-D2-C3-12-72**	
Dian Toni Hp		**Eki Hp Evercross**	
00-03-7E-EE-5C-46		**00-27-15-07-96-7B**	
Fakih Hp		**Salsa hp xiiomi**	
24-E2-71-E0-09-02		**00-E0-4C-41-59-08**	
34 Users		**34 Users**	

Based on the data the user's mac address that terinput in obtain internet users by using more laptops in comparison laptop. More than users want to access with hp (android) because it is easier and commonly used to open social media applications such as (watsapp, instagram, facebook) for daily needs. And if the user wants to use the laptop users usually see more view youtube or do the task. So bandwidth can be easily controlled.

History of internet users on 12 to 13 June 2017 in wi-fi hotspot RT 01 RW 02 Dukuh Tinawas Boyolali Jawa Tengah we distinguish by looking at rush hour. In view of user activity we divide and observe in the morning hours (03.00 - 10.00 wib) at noon (10.00 - 15.00 wib) afternoon (15.00 - 22.00 wib) and night (22.00 - 03.00 wib). Here is the user connected data on Sunday 12 to 13 June 2017 (see table 2).

Table 2. Users whose were connected in the morning, noon, afternoon and night time.

User at morning	User at noon	User at afternoon	User at night
Zaki Tab Axioa	Auli laptop acer	Auli laptop acer	Eki Hp Evercross
00-E2-7247-0C-49	**24-FD-52-49-B2-D0**	**24-FD-52-49-B2-D0**	**00-27-15-07-96-7B**
Aji Laptop Asus	Santi laptop compact	Fia Tab Advan	Rivaldi laptop acer
80-A5-89-6A-1B-3F	**00-0A-00-DC-CC-F7**	**00-0A-00-B9-23-5B**	**00-0A-00-86-1F-60**
Ino laptop Toshiba	Erwin laptop asus	Tito HP Samsung E5	Auli laptop acer
B0-DF-3A-40-3B-72	**A0-F3-C1-E5-90-1F**	**08-EE-8B-EC-70-OC**	**24-FD-52-49-B2-D0**
Auli laptop acer	Karisma Laptop	Salsa hp xiiomi	
24-FD-52-49-B2-D0	**84-4B-F5-99-7B-B4**	**00-E0-4C-41-59-08**	
Santi laptop compact	Soleh Hp	Faisal laptop acer	
00-0A-00-DC-CC-F7	**C8-D7-79-4B-5A-70**	**08-8C-2C-05-B6-E7**	
Opi Hp Samsung	Faisal laptop acer	Edwin Tab Advan	
E4-FB-EF-D1-00-EF	**08-8C-2C-05-B6-E7**	**00-0A-00-67-61-BE**	
Erwin laptop asus	Afan HP Samsung	Tito Netbook Toshiba	
A0-F3-C1-E5-90-1F	**9C-27-71-66-CB-75**	**68-A3-C4-98-17-92**	
Opi Tablet Vandroid	Eki Hp Evercross	Santi Laptop Hp	
30-AA-BD-04-93-93	**00-27-15-07-96-7B**	**C4-8E-8F-76-FC-F3**	

Table 2. Users whose were connected in the morning, noon, afternoon and night time (cont.)

Alice Acer **68-94-23-74-5D-21** Catur Laptop **CC-52-AF-0F-A9-8C** Yoga Hp Smartfren **F6-D0-10-AE-C3-F7** Soleh Hp **C8-D7-79-4B-5A-70** Eki Hp Evercross **00-27-15-07-96-7B** Karisma Laptop **84-4B-F5-99-7B-B4** Tito Netbook Toshiba **68-A3-C4-98-17-92**	Tito Netbook Toshiba **68-A3-C4-98-17-92** Gadru HP **00-08-22-DE-8A-38** Piu HP Advan **00-27-15-38-24-D2** Ino laptop Toshiba **B0-DF-3A-40-3B-72** Ino Netbook Acer **E0-06-E6-57-4E-06** Santi Laptop Hp **C4-8E-8F-76-FC-F3**	Jonathan HP **24-E2-71-12-F4-B0** Alif Opo **CC-2D-83-98-36-38** Candra Tab **00-0A-00-A7-BD-29** Dian Toni Hp **00-03-7E-EE-5C-46** Gadru HP **00-08-22-DE-8A-38** Rivaldi laptop acer **00-0A-00-86-1F-60** Eki Hp Evercross **00-27-15-07-96-7B**	
16 users	15 users	16 users	3 users

From the time differentiations above, users tend to get the internet access in the morning, noon and afternoon, only a few of the users use the internet access at night. There is an average of 16 users connected to internet hotspot network on Sunday 12 June to 13 June 2017. From these data we can group some active users and users who are less active users. Very actively marked with the user always use the internet network from morning till night. Active can be marked users sometimes use the internet with the hours of morning and afternoon only. Less active when the user uses internet facilities only in the hours of the morning or afternoon only. This is due to several factors. First the user is located slightly away from the center of the internet and the second user is just accessing the internet as needed only.

From the user connected data on 12-13 June 2017 which is shown in the table , there are 10 laptops and 6 smartphones connected to the network in the morning, 8 laptops and 7 smartphones in the noon, 5 laptops and 11 smartphones in the afternoon while 2 laptops and 1 smartphone were connected to the network in the night. This can be concluded that most of the smartphone users are connected to the network in the afternoon as for the laptop users tend to connected to the internet in the morning time. As for the other time, especially in the night, less people connected to the internet network.

Table 3. List of user based on the cost packet

1 day	3 days	1 week	1 month
(Rp. 3.000,00)	(Rp. 7.000,00)	(Rp. 15.000,00)	(Rp. 30.000,00)
Gadru HP 00-08-22-DE-8A-38 **Vendra Laptop Asus** 28-E3-47-B7-1F-A0 **Fia Laptop Acer** 1C-3E-84-62-F0-C1 **Zaki Tab Axioa** 00-E2-7247-0C-49	**Alice acer new** 6B-94-23-74-5D-21 **Fia Tab Advan** 00-0A-00-B9-23-5B **Aji Laptop Asus** 80-A5-89-6A-1B-3F **Tito Netbook Toshiba** **68-A3-C4-98-17-92**	**Fakih HP** D8-57-EF-5D-82-6C **Arya HP Lenovo** **74-04-2B-6F-34-80** **Hanifah Samsung hp** **20-5E-F7-2D-48-E2** **Fakih Laptop** B8-EE-65-51-B1-EB	**Fia Laptop Acer** 1C-3E-84-62-F0-C1 **Alice Acer** 68-94-23-74-5D-21 Auli laptop acer **24-FD-52-49-B2-D0** Rivaldi laptop acer **00-0A-00-86-1F-60**

Table 3. List of user based on the cost packet (cont.)

Zaki Tab Axioa
00-E2-7247-0C-49
Evercross A7
00-0A-D0-E2-SC-8C
Hanifa Hp Soni
1C-7B-21-DD-D9-D3
Zaki laptop acer
74-EA-3A-EE-CC-9E
Toni HP Iphone
E4-25-E7-4A-0D-64
Matoni Laptop Acer
F4-B7-E2-86-FE-14
Titto Laptop Toshiba
00-22-FA-9A-E5-A2
Santi HP Nokia
10-2F-6B-95-D2-AA
Arimbi Tab Mito
00-08-22-06-2E-63
Opi Laptop Asus
FO-03-8C-15-C9-21
Piu HP Advan
00-27-15-38-24-D2
Rasyid Hp Asus
70-8B-CD-72-47-F2
Ipie Laptop Acer
00-1E-64-0D-39-DB
Edwin Tab Advan
00-0A-00-67-61-BE
Fia HP Samsung
54-40-AD-90-69-0F
Titto Lenovo
48-88-CA-69-05-E5
Edwin HP
20-5E-F7-1A-22-A2
Tito HP Samsung E5
08-EE-8B-EC-70-OC
Alif Tablet Advan
00-0A-00-5C-71-C6
Anis HP
BC-20-10-2C-0A-E2
Nurohman Hp
54-27-58-1B-32-8B
Yoga Hp Smartfren
F6-D0-10-AE-C3-F7
Mateo Hp Asus
D0-17-C2-84-2F-39
Candra Tab
00-0A-00-A7-BD-29
Adit Hp Lenovo
74-E5-43-EE-54-C6
Dea Hp Samsung
A0-82-1F-72-89-4A
Enggal Tab
48-A2-D2-C3-12-72
Dian Toni Hp
00-03-7E-EE-5C-46
Fakih Hp
24-E2-71-E0-09-02
Soleh Hp
C8-D7-79-4B-5A-70
Nisa Hp SPC
EE-4A-5B-11-12-2B
Mateo Tab Asus
60-A4-4C-48-8C-EB
Isa Hp Samsung
7C-F9-CE-03-88-6E
Salsa HP Cross A5
00-9C-02-72-9B-41
Jonathan HP
24-E2-71-12-F4-B0

Rival Laptop Hp
CC-52-AF93-94-B8
Salsa Laptop Zirex
00-1E-65-7D-AC-7A
Rasid laptop Toshiba
7C-F9-0E-02-E1-62
Arul Laptop Asus
6C-71-D9-89-2F-53
Opi HP Oppo
A4-32-78-DA-F7-48
Isa HP Evercross
68-A3-C4-14-85-43
Salsa Hp Putih
00-27-15-54-72-13
Bayu Hp Lenovo
CC-07-E4-60-69-A3
Aris Laptop
50-B7-C3-4F-07-38
Erwin laptop asus
A0-F3-C1-E5-90-1F
Opi Netbook Hp
74-F0-6D-4C-29-E2
Rasid HP Samsung
88-A7-3C-EC-34-C0
Aral HP Opo
1C-77-F6-4D-4F-23
Ana Salsa HP 6C-5F-1C-FB-04-AE
Zaki HP Mito
9C-04-73-C6-F2-32
Rasid HP Andromax
00-07-A8-6D-A5-OC
Damar laptop
58-A2-85-99-E3-88
Rivaldi laptop acer
00-0A-00-86-1F-60
Nafis Tab Advan
00-0A-00-78-AD-64
Tiyus Hp
24-E2-71-C0-BA-66
Ian Hp Asus
AC-9E-17-EF-D1-EF
Kristian Hp
00-49-5A-E8-77-0F
Rahman Hp
18-CA-2D-BD-E4-FC
Putra Salon
48-A2-2D-C3-12-73
Enggal Tab Ever
48-A2-D2-C3-12-72
Eki Hp Evercross
00-27-15-07-96-7B
Salsa hp xiiomi
00-E0-4C-41-59-08
Adit HP evercross
00-0A-00-5A-5A-EE
Opi Tablet Vandroid
30-AA-BD-04-93-93
Bimo Tab
00-08-22-76-BB-FB
Feri Hp evercross
00-0A-00-59-DA-34
Lia Tab Mitto
00-08-22-06-34-43

35 users

Danang Laptop
5C-93-A2-B5-SC-FF
Diki laptop acer
F8-D1-11-0C-OB-F0
Afan HP Samsung
9C-27-71-66-CB-75
Salsa laptop baru
00-9C-02-72-9B-41
Zahra HP Oppo
1C-77-F6-57-7B-DB
Hanif HP Mitto
60-FE-1E-4B-C9-CE
Titto HP Samsung
24-C6-96-B8-B7-51
Naufal HP
88-70-8C-27-EB-AF
Satrio Hp Lenovo
AC-9E-17-62-F2-D1
Diki Hp Asus
2C-D0-5A-15-C2-F4
Nisa Laptop Compac
1C-65-9D-63-8B-91
Soleh netbook
E0-89-22-A6-F5-C1
Jonatan Laptop
9C-AD-97-AE-77-5D
Bayu laptop asus
68-94-23-A1-9E-FD
Catur Laptop
CC-52-AF-0F-A9-8C
Fakih laptop
30-7C-30-B4-7D-F1
Santi Laptop Hp
C4-8E-8F-76-FC-F3
Dian Netbook Asus
00-08-CA-9E-7D-DF
Karisma Laptop
84-4B-F5-99-7B-B4
Rahman laptop
18-CA-2D-BD-E4-FC
David laptop acer
70-AA-B2-B8-57-5E
Faisal laptop acer
08-8C-2C-05-B6-E7
Ino laptop Toshiba
B0-DF-3A-40-3B-72
Maksum laptop
00-08-22-2F-49-24

28 users

Isa Laptop Lenovo
74-E5-43-EE-54-C6
Salsa Laptop
9C-B7-0D-C1-6C-FD
Erlin laptop Toshiba
00-0A-00-A7-89-5C
Desi Laptop Asio
E0-89-A5-32-84-F2
Rasid Laptop
B8-86-87-43-7F-35
Ino Netbook Acer
E0-06-E6-57-4E-06
Tatit laptop Samsung
6C-F3-73-46-80-A4
Santi laptop compac
00-0A-00-DC-CC-F7
Fakih laptop
00-27-15-54-41-42

13 users

Table 3. List of user based on the cost packet (cont.)

Alif Opo	
CC-2D-83-98-36-38	
Nisa Hp Opo	
8C-DE-E8-FC-65-58	
Opi Hp Samsung	
E4-FB-EF-D1-00-EF	
41 users	

The cost must be payed by admin to Telkom is Rp. 360.000,00 for a month unlimited internet access with bandwidth FUP (Fair Usage Policy) 200 GB, as for the cost classifications applied to the internet clients are as shown as in the table 3. The table 3 above showed that most of the smartphone users subscribed 1 day and 3 days packets which are take cost Rp. 3.000,00 and Rp. 7.000,00 respectively. As for the laptop users, most of them subscibed for weekly and monthly packet which are take cost Rp. 15.000,00 and Rp. 30.000,00 respectively. This is because most of the laptop users are worker while most of the smartphone users are student and it is known that students have not much money so that most of them only subscribed the internet network dayly which is cheaper in price. From the system created, the admin gained profit around Rp. 200.000,00 per month.

Figure 7 above is the picture shows the activity of the user during internet use. The data shows that Tuesday the 13th of June 2017 the last admin results see inside Mikrotik. From the data there is a green graph that has the meaning of the speed of the user is obtained while the blue graph indicates that the bandwidth of the ISP. There are numbers 10, 12, 14 and so it shows time. The first network security is the security Login admin through the winbox to set the Mikrotik up.

The graph shows that the access activity of citizens on 12th and 13th June 2017 shows the most of active users at 01.00 p.m and 06 a.m on 12th june and 04.00 p.m on 13th june 2017. The psychological condition of the villagers are the citizens who rarely get up at night to access the internet. So it can be concluded that the activities of the villagers are active during the morning and afternoon.

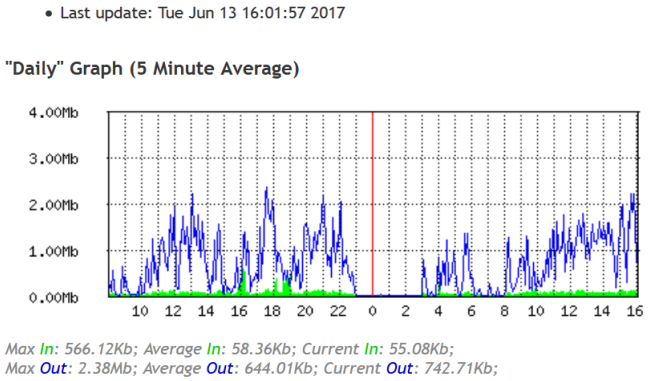

Figure 7. Grafik internet 5 minut average

The login security admin just need to enter the username and password before it can access the data inside Mikrotik. This security is in need because not everyone gets into the system Mikrotik. In addition to security in login Mikrotik admin can also be security through TP-LINK. Function of both security is almost same but in TP-LINK admin focused in keeping people other than admin not to replace and add user in MAC Address. Therefore admin must have login security inside TP-LINK. Here is a picture of Mikrotik login: see figure 8 dan 9 bellow:

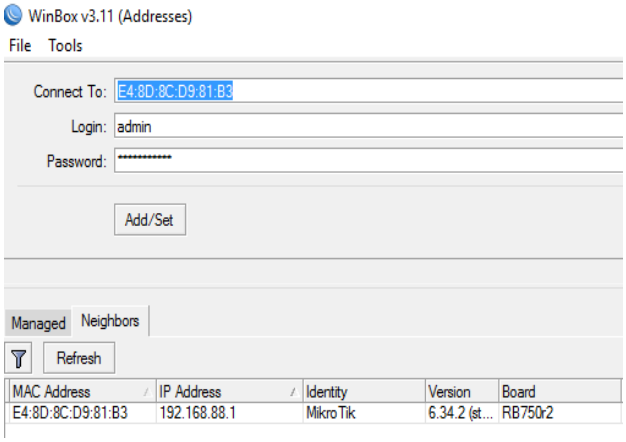

Figure 8. Mikrotik Login Security

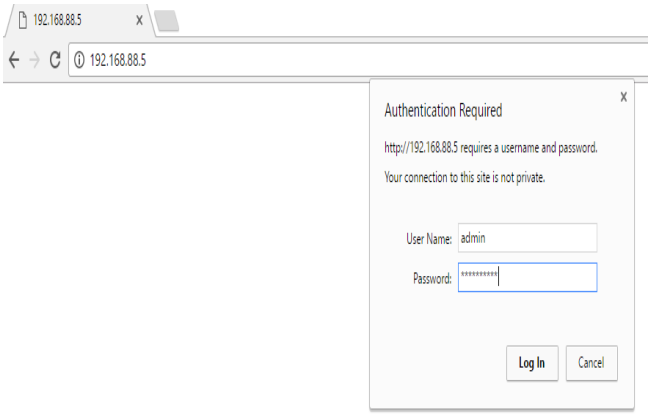

Figure 9. TP-LINK Login Security

Bandwidth management is done inside Mikrotik. Simple queque inside Mikrotik admin use as bandwidth management. This admin manage bandwidth management with a minimum speed of 384 Kbps or equivalent to 48 KBps it is done in admin because so that all can be connected and should be stable by just opening the internet and download. With that speed the user can download with an average speed of 221 KBps and with a bandwidth limit of 48 KBps. With so hoped to help Tinawas Village residents to connect to the internet. Here is a picture of bandwidth limit in Mikrotik. See figure 10 and 11 bellow:

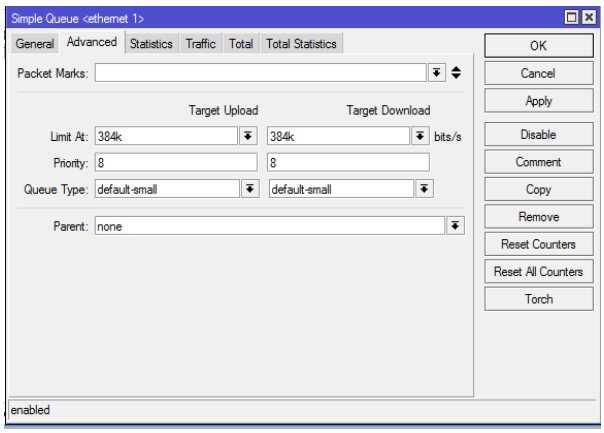

Figure 10. Management Banwith (limit)

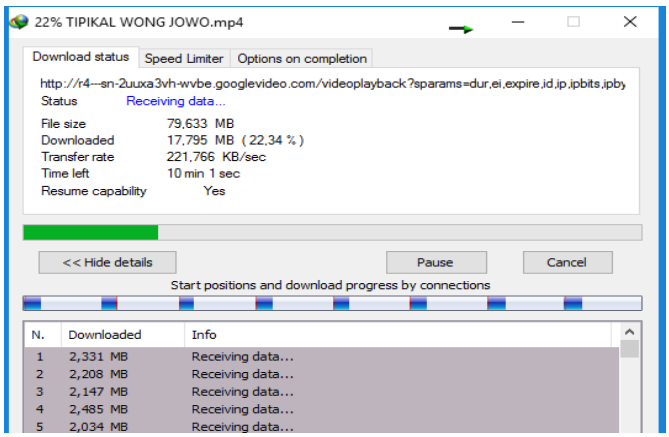

Figure 11. Test Download

5.CLOSING

The conclusion that can be taken from the Final Project by Building a RT / RW Net Network based on WI-FI hotspot at RT 02 RW 01 Dukuh Tinawas Boyolali Central Java is as follows :

1. The wireless and cable networks had been built during this research in Tinawas village RT 02 RW 01 Nogosari Boyolali Jawa Tengah.
2. There were accesses from about 16 users per day.
3. The network could helps the villagers in accessing internet network.
4. In the present time, the network built could serves laptop and cell phone users in Dukuh Tinawas Nogosari Boyolali.

Network RT / RW Net based WI-FI hotspots in RT 02 RW 01 Tinawas village, Boyolali Central Java is indeed still far from perfect word because there are still things that need to be improved in further research. Suggestions for further research are:

1. Need the addition of tools because many residents in RT 02 RW 01 want to connect on the internet network.
2. Need to make a special guide, so the primary school children who want to connect the internet does not ask when every time how to connect the internet.
3. Obstructing access of websites which are contained adult and porn inside.

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